REMARKS

This application has been reviewed in light of the Office Action dated August 5, 2009. Claims 26-47 are presented for examination, of which Claims 26, 46, and 47, are in independent form. Claims 26, 27, 33-39, 42, and 45-47 have been amended to define aspects of Applicants' invention still more clearly. Favorable reconsideration is requested.

Claims 35-37 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite, for lack of antecedent basis for the term "plate" in Claim 35. Applicants have carefully reviewed and amended Claim 35, as deemed necessary, with special attention to the points raised on page 2 of the Office Action. Specifically, the phrase "plate" has been changed to --board--. It is believed that the indefiniteness rejections have been obviated, and therefore their withdrawal is respectfully requested.

Claims 26-28, 35, and 38-47 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,498,355 (Harrah et al.; hereinafter "*Harrah*"); and Claims 29-34, 36, and 37 were rejected as being unpatentable over *Harrah*, and further in view of U.S. Pat. Appln. Pub. 2004/0065894 (Hashimoto et al.; hereinafter "*Hashimoto*"). Applicants submit that independent Claims 26, 46, and 47, together with the remaining claims dependent therefrom, are patentably distinct from the cited prior art for at least the following reasons.

Claim 26 is directed to a light-emitting diode arrangement. The arrangement includes a light-emitting diode chip and a multi-layer board having a base of a thermally well-conducting material that includes a metal. The base is a core of the board and is

configured for heat dissipation. The arrangement also includes an electrically insulating and thermally conducting connection layer positioned between an emission surface of the light-emitting diode chip and the board. Between the light-emitting diode chip and the base of the board there is arranged an intermediate carrier separate from parts with which the light-emitting diode chip is electrically contacted. The intermediate carrier includes an aluminum nitride substrate.

Among other notable features of Claim 26 is that the arrangement includes an electrically insulating and thermally conducting connection layer between an emission surface of the light-emitting diode chip and the board. As stated at page 4 of the specification, "Since in contrast to the state of the art, the thermally insulating (epoxide) layer is not required, the heat transfer from the light emitting diode chip to the heat dissipating base material of the board is significantly improved." Accordingly, by virtue of this feature of an electrically insulating and thermally conducting connection layer, the thermal resistance of heat flowing from the LED can be reduced. Also, electricity consumption can be reduced.

Harrah relates to light emitting diodes and arrays of light emitting diodes. As understood by Applicants, *Harrah* teaches an LED arrangement that includes a metal substrate 6 that purportedly effectively spreads and dissipates heat flowing from an LED. (See, e.g., *Harrah* at column 4, lines 14-15 and column 5 lines 15-16 and 54-55.) The *Harrah* arrangement includes solder bumps 32, a submount 30, a thermal contact 46 disposed on the bottom side of submount, and a thermally conductive material 24. (See, e.g., *Harrah* at column 4, lines 55-57.) According to *Harrah*, the combination of solder

bumps 32, submount 30, thermal contact 46, and thermally conductive material 24 allegedly provides a low thermal-resistance path for heat to flow from an LED 28 to a metal substrate 6. (See, e.g., *Harrah*, at column 5, lines 13-16.)

Applicants submit, however, that because the thermal contact 46 of *Harrah* is formed by solderable metal layers, the thermal contact 46 is electrically conductive and is not electrically insulating. (See, e.g., *Harrah* at column 4, lines 62-65.) Also, the thermally conductive material 24 of *Harrah* (such as that located in a via 12) apparently is formed of different metals, compounds, and matrixes, e.g. solderable nickel/tin, diamond, or silver filled. (See, e.g., *Harrah*, Fig.3 and column 4, line 55 to column 5, line 31; column 4, lines 66-67; column 3, lines 37-42 and lines 54-58.) It is respectfully submitted that such materials also are electrically conductive; in contrast, the thermally conductive connection layer of Claim 26 is not electrically conductive.

Nothing has been found in *Harrah* that is believed to teach or suggest an electrically insulating and thermally conducting connection layer between an emission surface of the light-emitting diode chip and the board, as claimed in Claim 26. Indeed, *Harrah* does not teach or suggest any layer that combines the attributes of thermal conductivity and electrical insulation. Accordingly, Applicants submit that Claim 26 is patentable over *Harrah* and respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a).

Independent Claims 46 and 47 recite features similar to those discussed above with respect to Claim 26, and are believed to be patentable for at least the reasons discussed above in connection with Claim 26. The other claims in this application depend

from one or another of Claims 26, 46, and 47 and therefore are submitted to be patentable for at least the same reasons. Because each dependent claim also is deemed to define an additional aspect of the invention, however, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and an early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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